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| Term           | Documents |
|----------------|-----------|
| (6 OR 4).USPT. | 26        |

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IBM Technical Disclosure Bulletins

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14 or 16

[Clear](#)**Search History****Today's Date: 3/15/2001**

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|----------------|-----------------|------------------|-----------------|
| USPT           | 14 or 16        | 26               | <u>L8</u>       |
| USPT           | 15 or 16        | 10               | <u>L7</u>       |
| USPT           | 15 and insect\$ | 9                | <u>L6</u>       |
| USPT           | photorhabdus    | 10               | <u>L5</u>       |
| USPT           | 12 and toxi\$   | 23               | <u>L4</u>       |
| USPT           | 11 and insect\$ | 38               | <u>L3</u>       |
| USPT           | 11 and insect\$ | 38               | <u>L2</u>       |
| USPT           | xenorhabdus     | 63               | <u>L1</u>       |

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=> file medline biotechno caplus embase scisearch biosis

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SESSION  
0.15

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FILE 'BIOTECHNO' ENTERED AT 11:09:57 ON 15 MAR 2001

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FILE 'BIOSIS' ENTERED AT 11:09:57 ON 15 MAR 2001

COPYRIGHT (C) 2001 BIOSIS(R)

=> s xenorhabdus

L1 1128 XENORHABDUS

=> s l1 and insect?

L2 477 L1 AND INSECT?

=> s l2 and oral

L3 9 L2 AND ORAL

=> dup rem l3

PROCESSING COMPLETED FOR L3

L4 9 DUP REM L3 (0 DUPLICATES REMOVED)

=> d ti 1-9

L4 ANSWER 1 OF 9 CAPLUS COPYRIGHT 2001 ACS

TI **Oral insecticides** from the parasitic nematode  
symbiotic bacterium **Xenorhabdus** bovienii

L4 ANSWER 2 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS

TI **Insecticidal** protein toxins from **xenorhabdus**.

L4 ANSWER 3 OF 9 SCISEARCH COPYRIGHT 2001 ISI (R)

TI Secreted proteases from Photorhabdus luminescens: separation of the  
extracellular proteases from the **insecticidal** Tc toxin complexes

L4 ANSWER 4 OF 9 SCISEARCH COPYRIGHT 2001 ISI (R)

TI Photorhabdus luminescens W-14 **insecticidal** activity consists of  
at least two similar but distinct proteins - Purification and  
characterization of toxin A and toxin B

L4 ANSWER 5 OF 9 SCISEARCH COPYRIGHT 2001 ISI (R)

TI Successful parasitization of locusts by entomopathogenic nematodes is  
correlated with inhibition of **insect** phagocytes

L4 ANSWER 6 OF 9 CAPLUS COPYRIGHT 2001 ACS

TI Pesticidal agents

L4 ANSWER 7 OF 9 SEARCH COPYRIGHT 2001 ISI (R)  
 TI Insecticidal toxins from the bacterium *Photobacterium luminescens*

L4 ANSWER 8 OF 9 EMBASE COPYRIGHT 2001 ELSEVIER SCI. B.V.  
 TI Biologically active metabolites from *Xenorhabdus* spp., Part 1.  
 Dithiolopyrrolone derivatives with antibiotic activity.

L4 ANSWER 9 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS  
 TI EFFORTS TO INDUCE DEFENSE RESPONSES IN THE GREATER WAX MOTH LARVAE BY  
 ORAL FEEDING OF INSECT PATHOGENIC BACTERIA.

=> d 1 2 8 9

L4 ANSWER 1 OF 9 CAPLUS COPYRIGHT 2001 ACS  
 AN 2000:367999 CAPLUS  
 DN 133:13736  
 TI Oral insecticides from the parasitic nematode  
 symbiotic bacterium *Xenorhabdus bovienii*  
 IN Jarrett, Paul; Morgan, James Alun Wynne; Ellis, Debbie  
 PA Horticulture Research International, UK  
 SO PCT Int. Appl., 43 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 1

|      | PATENT NO.    | KIND | DATE   | APPLICATION NO. | DATE     |
|------|---------------|------|--|-----------------|----------|
| PI   | WO 2000030453 | A2   | 20000602   | WO 1999-GB3846  | 19991118 |
|      | WO 2000030453 | A3   | 20001019   |                 |          |
|      | W:            |      | AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |                 |          |
|      | RW:           |      | GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG   |                 |          |
| PRAI | GB 1998-25418 |      | 19981119   |                 |          |

L4 ANSWER 2 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS  
 AN 2000:461120 BIOSIS  
 DN PREV200000461120  
 TI Insecticidal protein toxins from *xenorhabdus*.  
 AU Ensign, Jerald C. (1); Bowen, David J.; Tenor, Jennifer L.; Ciche, Todd A.; Petell, James K.; Strickland, James A.; Orr, Gregory L.; Fatig, Raymond O.; Bintrim, Scott B.; Ffrench-Constant, Richard H.  
 CS (1) Madison, WI USA  
 ASSIGNEE: Dow AgroSciences LLC  
 PI US 6048838 April 11, 2000  
 SO Official Gazette of the United States Patent and Trademark Office  
 Patents,  
 (Apr. 11, 2000) Vol. 1233, No. 2, pp. No pagination. e-file.  
 ISSN: 0098-1133.  
 DT Patent  
 LA English

L4 ANSWER 8 OF 9 EMBASE COPYRIGHT 2001 ELSEVIER SCI. B.V.  
 AN 92003845 EMBASE  
 DN 1992003845  
 TI Biologically active metabolites from *Xenorhabdus* spp., Part 1.  
 Dithiolopyrrolone derivatives with antibiotic activity.

AU McInerney B.V.; Gregson R.P.; Lacey M.J.; Akhurst R.J.; Lyons G.R.;  
Rhodes  
S.H.; Smith D.R. ; Engelhardt L.M.; White A.H.  
CS Biotech Australia Pty. Ltd., P.O. Box 20, Roseville, NSW 2069, Australia  
SO Journal of Natural Products (Lloydia), (1991) 54/3 (774-784).  
ISSN: 0163-3864 CODEN: JNPRDF  
CY United States  
DT Journal; Article  
FS 004 Microbiology  
052 Toxicology  
037 Drug Literature Index  
LA English  
SL English

L4 ANSWER 9 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS  
AN 1987:126744 BIOSIS  
DN BA83:65805  
TI EFFORTS TO INDUCE DEFENSE RESPONSES IN THE GREATER WAX MOTH LARVAE BY  
**ORAL FEEDING OF INSECT PATHOGENIC BACTERIA.**  
AU GLINSKI Z; JAROSZ J  
CS BEE DISEASES RESEARCH LABORATORY, AGRICULTURAL UNIVERSITY, LUBLIN,  
AKADEMICKA 12, POLAND.  
SO COMP BIOCHEM PHYSIOL A COMP PHYSIOL, (1986) 85 (4), 673-678.  
CODEN: CBPAB5. ISSN: 0300-9629.  
FS BA; OLD  
LA English

=> d ab 1 2 8 9

L4 ANSWER 1 OF 9 CAPLUS COPYRIGHT 2001 ACS  
AB Disclosed are novel strains of **Xenorhabdus bovienii** deposited  
with NCIMB under accession nos. NCIMB 40985 and NCIMB 40986 which are a  
source of orally acting pesticides. Also disclosed are pesticidal agents  
from *X. bovienii* strains; have **oral insecticidal**  
activity against one or more species of **insect** of the order  
Lepidoptera, Coleoptera or Homoptera; are substantially heat stable to  
50.degree.C; and act synergistically with *Bacillus thuringiensis* cells as  
an **oral insecticide**. The invention further makes  
available nucleic acids encoding these and variant toxins, plus vectors,  
host cells and plants transformed with the same. Also disclosed are  
**insecticidal** polypeptides (and antibodies raised to them) and  
compsn., plus methods of using all of these materials for the control of  
pests, particularly **insects**.

L4 ANSWER 2 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS  
AB Proteins from the genus **Xenorhabdus** are toxic to **insects**  
upon **oral** exposure. These protein toxins can be applied to  
**insect** larvae food and plants for **insect** control.

L4 ANSWER 8 OF 9 EMBASE COPYRIGHT 2001 ELSEVIER SCI. B.V.  
AB Five related antibiotic compounds, named xenorhabdins, were isolated from  
cultures of **Xenorhabdus** spp., bacteria symbiotically associated  
with **insect**- pathogenic nematodes. Their chemical structures  
were elucidated by X-ray crystallography, nmr, and mass spectral analyses  
to be N-acyl derivatives of either 6-amino-4,5-dihydro-5-oxo-1,2-  
dithiolo[4,3-b] pyrrole (compounds 1-3) or  
6-amino-4,5-dihydro-4-methyl-5-  
oxo-1,2-dithiolo[4,3-b] pyrrole (compounds 4 and 5). They are previously  
unreported members of the pyrrothine family of antibiotics. Antimicrobial  
and **insecticidal** activities were found. These metabolites are  
specific to phase one **Xenorhabdus**.

L4 ANSWER 9 OF 9 BIOSIS COPYRIGHT 2001 BIOSIS

AB 1. Attempts were made to stimulate or induce the internal defence system in the greater moth larvae by oral feeding of the insect non-sporulating bacterial parasites *Pseudomonas aeruginosa*, *Serratia marcescens* or *Xenorhabdus nematophilus*. 2. After ingesting pathogens, an acquired immunity against an intrahaemocoelic challenge close of viable *P. aeruginosa* cells was not found in the three insect model systems: monoxenic, axenic and germ-free larvae, although in some treatments a negligibly elevated level of blood lysozyme activity appeared. 3. Animals given an injection of foreign soluble or particulate molecules directly into the larval haemocoel, including saline W, a physiological salt solution for lepidopterous larvae, showed an apparently increased concentration of blood lysozyme and withstood challenge with a lethal dose of *P. aeruginosa*. 4. These results are discussed in terms of the consideration that chitinase activity may affect the insect gut barriers enabling the contact of bacterial invaders with epithelial gut cells, and therefore it may help to demonstrate the inducible immunity by the oral route in a more convenient model system.

=> logoff

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LOGOFF? (Y)/N/HOLD:n

=> d his

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FILE 'MEDLINE, BIOTECHNO, CAPLUS, EMBASE, SCISEARCH, BIOSIS' ENTERED AT 11:09:57 ON 15 MAR 2001

L1 1128 S XENORHABDUS  
L2 477 S L1 AND INSECT?  
L3 9 S L2 AND ORAL  
L4 9 DUP REM L3 (0 DUPLICATES REMOVED)

=> s l1 and toxin

L5 34 L1 AND TOXIN

=> dup rem l5

PROCESSING COMPLETED FOR L5  
L6 23 DUP REM L5 (11 DUPLICATES REMOVED)

=> l6 not l4

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=> s l6 not l4

L7 17 L6 NOT L4

=> d ti 1-17

L7 ANSWER 1 OF 17 MEDLINE

TI Novel insecticidal toxins from nematode-symbiotic bacteria.

L7 ANSWER 2 OF 17 MEDLINE  
 TI Photorhabdus toxins: novel biological insecticides.

L7 ANSWER 3 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insect viral vectors for gene transfer based on Nodavirus RNA

L7 ANSWER 4 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal **toxin** from **Xenorhabdus** nematophilus, symbiotic bacterium associated with entomopathogenic nematode *Steinernema glaseri*

L7 ANSWER 5 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal toxins and genes of **Xenorhabdus** and *Photorhabdus* and methods for insect control and production of insect-resistant plants

L7 ANSWER 6 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Effect of **toxin** protein from **Xenorhabdus** *luminescens* (Xlpt) on esterase of hemolymph of larvae of *Pieris rapae* L.

L7 ANSWER 7 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal toxins from **Xenorhabdus** *nematophilus* and *Photorhabdus* *luminescens* and the genes encoding them and their use in pest control

L7 ANSWER 8 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal protein toxins from **Xenorhabdus**

L7 ANSWER 9 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal protein toxins from *Photorhabdus* *luminescens*

L7 ANSWER 10 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI An insecticidal protein **toxin** complex from *Photorhabdus* and cloning and expression of cDNAs encoding the components

L7 ANSWER 11 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Insecticidal **toxin** and gene from **Xenorhabdus** *nematophilus*

L7 ANSWER 12 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 TI Involvement of larvicidal toxins in pathogenesis of insect parasitism with the rhabditoid nematodes, *Steinernema feltiae* and *Heterorhabditis bacteriophora*

L7 ANSWER 13 OF 17 SCISEARCH COPYRIGHT 2001 ISI (R)  
 TI Trans-specific nematocidal activity of *Photorhabdus* *luminescens*

L7 ANSWER 14 OF 17 SCISEARCH COPYRIGHT 2001 ISI (R)  
 TI Purification and characterization of a high-molecular-weight insecticidal protein complex produced by the entomopathogenic bacterium *Photorhabdus* *luminescens*

L7 ANSWER 15 OF 17 BIOSIS COPYRIGHT 2001 BIOSIS  
 TI **Toxin** gene from **Xenorhabdus** *nematophilus*.

L7 ANSWER 16 OF 17 BIOSIS COPYRIGHT 2001 BIOSIS  
 TI Effect of cucurbitacin D on in vitro growth of **Xenorhabdus** and *Photorhabdus* spp., symbiotic bacteria of entomopathogenic nematodes.

L7 ANSWER 17 OF 17 BIOSIS COPYRIGHT 2001 BIOSIS  
 TI COMPARATIVE STUDIES ON PARASITISM CAUSED BY ENTOMOGENOUS NEMATODES *STEINERNEMA-FELTIAE* AND *HETERORHABDITIS-BACTERIOPHORA* I. THE ROLES OF THE

NEMATODE-BACTERIAL COMPLEX AND OF THE ASSOCIATED BACTERIA ALONE IN  
PATHOGENESIS.

=> d 1-8 10 11

L7 ANSWER 1 OF 17 MEDLINE  
AN 2000350267 MEDLINE  
DN 20350267  
TI Novel insecticidal toxins from nematode-symbiotic bacteria.  
AU ffrench-Constant R H; Bowen D J  
CS Department of Biology and Biochemistry, University of Bath, United  
Kingdom.. bssrfc@bath.ac.uk  
SO CELLULAR AND MOLECULAR LIFE SCIENCES, (2000 May) 57 (5) 828-33. Ref: 23  
Journal code: CLE. ISSN: 1420-682X.  
CY Switzerland  
DT Journal; Article; (JOURNAL ARTICLE)  
General Review; (REVIEW)  
(REVIEW, TUTORIAL)  
LA English  
FS Priority Journals; Cancer Journals  
EM 200009  
EW 20000905

L7 ANSWER 2 OF 17 MEDLINE  
AN 1999316464 MEDLINE  
DN 99316464  
TI Photorhabdus toxins: novel biological insecticides.  
AU ffrench-Constant R; Bowen D  
CS Department of Biology and Biochemistry, University of Bath, Bath, BA2  
7AY,  
UK.. ffrench@vms2.macc.wisc.edu  
SO Curr Opin Microbiol, (1999 Jun) 2 (3) 284-8. Ref: 28  
Journal code: DAY. ISSN: 1369-5274.  
CY ENGLAND: United Kingdom  
DT Journal; Article; (JOURNAL ARTICLE)  
General Review; (REVIEW)  
(REVIEW, TUTORIAL)  
LA English  
FS Priority Journals  
EM 199909  
EW 19990904

L7 ANSWER 3 OF 17 CAPLUS COPYRIGHT 2001 ACS  
AN 2000:707310 CAPLUS  
DN 133:277172  
TI Insect viral vectors for gene transfer based on Nodavirus RNA  
IN Dasgupta, Ranjit K.; Goodman, Robert  
PA Wisconsin Alumni Research Foundation, USA  
SO PCT Int. Appl., 99 pp.  
CODEN: PIXXD2  
DT Patent  
LA English  
FAN.CNT 1

|    | PATENT NO.   | KIND | DATE     | APPLICATION NO. | DATE     |
|----|--|------|----------|-----------------|----------|
| PI | WO 2000058487  | A2   | 20001005 | WO 2000-US8235  | 20000329 |
|    | WO 2000058487  | A3   | 20010208 |                 |          |
| W: | AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |      |          |                 |          |



RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE,  
DK, ES, FR, GB, GR, IE, IT, LU, MC, PT, SE, BF, BJ, CF,  
CG, CI, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRAI US 1999-281851 19990331

L7 ANSWER 4 OF 17 CAPLUS COPYRIGHT 2001 ACS  
AN 2000:419741 CAPLUS  
DN 133:146147  
TI Insecticidal toxin from *Xenorhabdus nematophilus*,  
symbiotic bacterium associated with entomopathogenic nematode *Steinernema glaseri*  
AU Ryu, Keun Garp; Bae, Jun Sang; Yu, Yeon Su; Park, Sun Ho  
CS Department of Chemical Engineering, University of Ulsan, Ulsan, 680-749,  
S. Korea  
SO Biotechnol. Bioprocess Eng. (2000), 5(2), 141-145  
CODEN: BBEIAU; ISSN: 1226-8372  
PB Korean Society for Biotechnology and Bioengineering  
DT Journal  
LA English  
RE.CNT 14  
RE  
(3) Bowen, D; Science 1998, V280, P2129 CAPLUS  
(6) Park, S; Biotechnol Bioprocess Eng 1999, V4, P12 CAPLUS  
(10) Schmidt, T; Appl Env Microbiol 1988, V54, P2793 CAPLUS  
(11) Smigielski, A; US 5972687 1999 CAPLUS  
(12) Smigielski, A; Appl Environ Microbiol 1994, V60, P120 CAPLUS  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 5 OF 17 CAPLUS COPYRIGHT 2001 ACS  
AN 1999:691217 CAPLUS  
DN 131:318603  
TI Insecticidal toxins and genes of *Xenorhabdus* and *Photorhabdus*  
and methods for insect control and production of insect-resistant plants  
IN Kramer, Vance Cary; Morgan, Michael Kent; Anderson, Arne Robert  
PA Novartis AG, Switz.; Novartis-Erfindungen Verwaltungsgesellschaft mbH  
SO PCT Int. Appl., 96 pp.  
CODEN: PIXXD2  
DT Patent  
LA English  
FAN.CNT 1

| PATENT NO. | KIND   | DATE     | APPLICATION NO. | DATE     |
|------------|--|----------|-----------------|----------|
| WO 9954472 | A1   | 19991028 | WO 1999-EP2629  | 19990419 |
| W:         | AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, VZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |          |                 |          |
| RW:        | GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG   |          |                 |          |
| US 6174860 | B1   | 20010116 | US 1999-293395  | 19990416 |
| AU 9936073 | A1   | 19991108 | AU 1999-36073   | 19990419 |
| EP 1082434 | A1   | 20010314 | EP 1999-917999  | 19990419 |
| R:         | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI   |          |                 |          |

PRAI US 1998-63982 19980421  
US 1999-123500 19990309  
US 1998-145748 19980421  
US 1999-125525 19990322  
WO 1999-EP2629 19990419

RE.CNT 9  
RE  
(1) Bowen, D; SCIENCE 1998, V280, P2129 CAPLUS

(2) Commw Scient Ind Res Org; WO 9500647 A 1995 CAPLUS  
 (7) Mycogen Corp; WO 903154 A 1993 CAPLUS  
 (8) Stemmer, W; NATURE 1994, V370, P389 CAPLUS  
 (9) Univ California; WO 9638547 A 1996 CAPLUS  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 6 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 AN 1999:649728 CAPLUS  
 DN 132:217647  
 TI Effect of **toxin** protein from **Xenorhabdus luminescens**  
 (Xlpt) on esterase of hemolymph of larvae of *Pieris rapae* L.  
 AU Wang, Xiaorong  
 CS Zhongkai Agricultural College, Canton, 510225, Peop. Rep. China  
 SO Huazhong Nongye Daxue Xuebao (1999), 18(4), 321-323  
 CODEN: HNDXEK; ISSN: 1000-2421  
 PB Huazhong Nongye Daxue  
 DT Journal  
 LA Chinese

L7 ANSWER 7 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 AN 1999:77446 CAPLUS  
 DN 130:149870  
 TI Insecticidal toxins from **Xenorhabdus nematophilus** and  
*Photorhabdus luminescens* and the genes encoding them and their use in  
 pest  
 control  
 IN East, Peter David  
 PA Commonwealth Scientific and Industrial Research Organisation, Australia  
 SO PCT Int. Appl., 48 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 1

|      | PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|------|---|------|----------|-----------------|----------|
| PI   | WO 9903328  | A1   | 19990128 | WO 1998-AU562   | 19980717 |
|      | W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |      |          |                 |          |
|      | RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG  |      |          |                 |          |
|      | AU 9883250  | A1   | 19990210 | AU 1998-83250   | 19980717 |
|      | EP 1018863  | A1   | 20000719 | EP 1998-933364  | 19980717 |
|      | R: AT, DE, ES, FR, GB, IT, RO   |      |          |                 |          |
| PRAI | AU 1997-8088  |      | 19970717 |                 |          |
|      | WO 1998-AU562   |      | 19980717 |                 |          |

RE.CNT 1

RE

(1) Commonwealth Scientific And Industrial Research Organisation; WO 9500647  
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L7 ANSWER 8 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 AN 1998:745093 CAPLUS  
 DN 130:1336  
 TI Insecticidal protein toxins from **Xenorhabdus**  
 IN Ensign, Jerald C.; Bowen, David J.; Tenor, Jennifer L.; Ciche, Todd A.;  
 Petell, James K.; Strickland, James A.; Orr, Gregory L.; Fatig, Raymond  
 O.; Bintrim, Scott B.; Ffrench-constant, Richard T.  
 PA Dow Agrosiences LLC, USA; Wisconsin Alumni Research Foundation  
 SO PCT Int. Appl., 47 pp.  
 CODEN: PIXXD2  
 DT Patent

LA English

FAN.CNT 1

|      | PATENT NO.     | KIND   | DATE     | APPLICATION NO. | DATE     |
|------|----------------|--|----------|-----------------|----------|
| PI   | WO 9850427     | A1   | 19981112 | WO 1998-US8993  | 19980504 |
|      | W:             | AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |          |                 |          |
|      | RW:            | GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG   |          |                 |          |
|      | AU 9871758     | A1   | 19981127 | AU 1998-71758   | 19980504 |
|      | EP 915909      | A1   | 19990519 | EP 1998-918938  | 19980504 |
|      | R:             | CH, DE, DK, ES, FR, GB, IT, LI, NL   |          |                 |          |
|      | US 6048838     | A  | 20000411 | US 1998-72264   | 19980504 |
|      | BR 9900622     | A  | 20000502 | BR 1999-622     | 19990128 |
| PRAI | US 1997-45641  |  | 19970505 |                 |          |
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L7 ANSWER 10 OF 17 CAPLUS COPYRIGHT 2001 ACS

AN 1997:448052 CAPLUS

DN 127:62053

TI An insecticidal protein **toxin** complex from Photorhabdus and cloning and expression of cDNAs encoding the components

IN Ensign, Jerald C.; Bowen, David J.; Petell, James; Fatig, Raymond; Schoonover, Sue; Ffrench-Constant, Richard H.; Rocheleau, Thomas A.; Blackburn, Michael B.; Hey, Timothy D.; Merlo, Donald J.; Orr, Gregory

L.;

Roberts, Jean L.; Strickland, James A.; et al.

PA USA

SO PCT Int. Appl., 275 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 2

|    | PATENT NO. | KIND   | DATE     | APPLICATION NO. | DATE     |
|----|------------|--|----------|-----------------|----------|
| PI | WO 9717432 | A1   | 19970515 | WO 1996-US18003 | 19961106 |
|    | W:         | AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM |          |                 |          |
|    | RW:        | KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG   |          |                 |          |
|    | CA 2209659 | AA   | 19970515 | CA 1996-2209659 | 19961106 |
|    | AU 9710509 | A1   | 19970529 | AU 1997-10509   | 19961106 |
|    | AU 729228  | B2   | 20010125 |                 |          |
|    | EP 797659  | A1   | 19971001 | EP 1996-941335  | 19961106 |
|    | R:         | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI   |          |                 |          |
|    | BR 9606889 | A  | 19971028 | BR 1996-6889    | 19961106 |
|    | WO 9808932 | A1   | 19980305 | WO 1997-US7657  | 19970505 |
|    | W:         | AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE,  |          |                 |          |

ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KR, KZ, LK, LR, LS, LT,  
 LU, LV, MG, MK, MN, MW, MX, NO, NZ, PT, RO, RU, SD, SE,  
 SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN  
 RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,

SE

AU 9728299 A1 19980319 AU 1997-28299 19970505  
 EP 970185 A1 20000112 EP 1997-922696 19970505  
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, FI  
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 JP 2000515024 T2 20001114 JP 1998-511612 19970505  
 PRAI US 1995-7255 19951106  
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 WO 1996-US18003 19961106  
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L7 ANSWER 11 OF 17 CAPLUS COPYRIGHT 2001 ACS  
 AN 1995:489957 CAPLUS  
 DN 122:232667  
 TI Insecticidal toxin and gene from *Xenorhabdus*  
*nematophilus*  
 IN Smigielski, Adam Joseph; Akhurst, Raymond Joseph  
 PA Commonwealth Scientific and Industrial Research Organization, Australia  
 SO PCT Int. Appl., 17 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 FAN.CNT 1

|      | PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|------|---|------|----------|-----------------|----------|
| PI   | WO 9500647  | A1   | 19950105 | WO 1994-AU348   | 19940624 |
|      | W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN |      |          |                 |          |
|      | RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG  |      |          |                 |          |
|      | AU 9469916  | A1   | 19950117 | AU 1994-69916   | 19940624 |
|      | AU 675335   | B2   | 19970130 |                 |          |
|      | EP 705340   | A1   | 19960410 | EP 1994-918696  | 19940624 |
|      | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT,  |      |          |                 |          |
| SE   | JP 09500264   | T2   | 19970114 | JP 1994-502250  | 19940624 |
|      | US 5972687  | A    | 19991026 | US 1996-569168  | 19960405 |
| PRAI | AU 1993-9638  |      | 19930625 |                 |          |
|      | WO 1994-AU348   |      | 19940624 |                 |          |

=> d ab 1-8, 10 11

L7 ANSWER 1 OF 17 MEDLINE  
 AB The current strategy of using transgenic crops expressing insecticidal protein toxins is placing increasing emphasis on the discovery of novel toxins, beyond those already derived from the bacterium *Bacillus thuringiensis*. Here we review the cloning of four insecticidal toxin complex (tc) encoding genes from a different bacterium *Photobacterium luminescens* and of similar gene sequences from *Xenorhabdus nematophilus*. Both these bacteria occupy the gut of entomopathogenic nematodes and are released into the insect upon invasion by the nematode. In the insect the bacteria presumably secrete these insecticidal toxins, as well as a range of other antimicrobials, to establish the insect cadaver as a monocultural breeding ground for both

bacteria and nematodes. In this review, the protein biochemistry and structure of the *tox* encoding loci are discussed in relation to their observed toxicity and histopathology. These toxins may prove useful as alternatives to those derived from *B. thuringiensis* for deployment in insect-resistant transgenic plants.

L7 ANSWER 2 OF 17 MEDLINE

AB Following concerns over the potential for insect resistance to insecticidal *Bacillus thuringiensis* toxins expressed in transgenic plants,

there has been recent interest in novel biological insecticides. Over the past year there has been considerable progress in the cloning of several alternative **toxin** genes from the bacteria *Photobacterium luminescens* and *Xenorhabdus nematophilus*. These genes encode large insecticidal **toxin** complexes with little homology to other known toxins.

L7 ANSWER 3 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB The invention provides insect viral vectors useful to transfer genes to plants, insects, and other hosts. To overcome the problems associated with the existing plant virus-based vectors and develop a highly efficient viral vector system for gene expression in plants, a Nodavirus-based vector was prepared. Preferably, the vector is derived from a virus having

a bipartite genome which comprises single-stranded linear RNA, e.g., a Nodavirus such as Flock House virus (FHV). Linked nucleic acid sequences include a nucleic acid sequence derived from the 5' end of FHV RNA-1 or RNA-2 and a nucleic acid sequence derived from the 3' end of FHV RNA-1 or RNA-2. The nucleic acid segment of interest preferably encodes a plant virus movement protein, a plant virus coat protein, a growth hormone, a **toxin** (such as *Photobacterium* **toxin**), a cytokine, disease resistance, pest resistance, male sterility, or antigenic sites on the surface of the a virus useful for vaccine production or pesticide resistance.

L7 ANSWER 4 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB Entomopathogenic nematodes are being used for insect control. A **toxin** secreted by the insect-pathogenic bacterium, *Xenorhabdus nematophilus*, which lives in the gut of entomopathogenic nematodes, was purified. Culture broth of *X. nematophilus* was separated by centrifugation and concentrated by ultrafiltration. The concentrated culture broth was applied to a DEAE Sephadex A-50 column, and proteins were eluted stepwise with increasing concentrations of KCl. Fractions with insect toxicity were further concentrated and then applied to a HPLC with

a gel filtration column. The molecular weight of purified **toxin** was 39 kDa on SDS-PAGE, and Fourier transformed IR (FTIR) spectroscopy indicated that this **toxin** could be a new protein exhibiting the characteristics of C=O stretching peak near 1650 cm<sup>-1</sup>.

L7 ANSWER 5 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB Nucleic acid sequences from *Xenorhabdus nematophilus*, *X. poinarii*, and *Photobacterium luminescens*, which encode insecticidal toxins are disclosed herein. The invention also discloses compositions and formulations containing the insecticidal toxins that are capable of controlling insect pests, especially *Plutella xylostella*. The invention is further drawn to methods of making the toxins and to methods of using the nucleotide sequences, for example in microorganisms to control insect pests or in transgenic plants to confer insect resistance. Thus, nucleic acid containing two ORFs was cloned from *X. nematophilus*. The ORFs were arranged in an operon-like structure. ORF1 encoded a 15-kDa protein of unknown activity. ORF2 encoded a 47.7-kDa protein with 30.6% sequence identity to a juvenile hormone esterase-related protein. Recombinant *E. coli* expressing ORF2 were stored at 4.degree. or 22.degree. for 2 wk, or freeze-dried and stored for 2 wk. There was no loss of insecticidal activity. Although heating of the *E. coli* samples at 60.degree. resulted

in no loss of activity, heating at 100.degree. resulted in total loss of activity.

L7 ANSWER 6 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB The effect of **toxin** protein from **Xenorhabdus luminescens** on esterase of hemolymph of larvae of *Pieris rapae* L. which were fed on Xlpt was studied by PAGE. In contrast to larvae without being fed on Xlpt, the zymogram changed, and the ABS of zymogram of the larvae without being fed on Xlpt were 2-10 times as much as those of zymogram the larvae fed on Xlpt.

L7 ANSWER 7 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB Insecticidal proteins are identified in bacteria from the genera **Xenorhabdus** and **Photorhabdus** and the genes encoding them are cloned. The genes may be incorporated into suitable vectors, such as insect-specific viruses (including entomopox and nuclear polyhedrosis viruses), bacteria (including Gracilicutes, Firmicutes, Tenericutes and Mendosicutes), protozoa, yeast and plants for control of insect pests. The gene for the **toxin** protein of *X. nematophilus* was cloned from a Sau3A partial digest bank by activity, using toxicity to *Galleria mellonella* as a functional assay. One of the clones was used to screen a *P. luminescens* library to obtain the homologous gene. The genes were not found in all strains of *P. luminescens* and only in a limited no. of species of **Xenorhabdus**.

L7 ANSWER 8 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB Insecticidal proteins are identified in culture supernatants of **Xenorhabdus** strains. A broad array of **Xenorhabdus** strains were characterized by a no. of taxonomic criteria and tested for their insecticidal properties. Culture supernatants were tested for insecticidal activity and supernatants from a no. of strains either inhibited growth or killed larvae of a no. of Coleopteran pests. The **toxin** of *X. riobravus* was purified and was shown to be very active against a no. of major pests (corn earworms and rootworms, European cornborer, tobacco hornworm and budworm). Chromatog. purifn. of the **toxin** from culture medium is described. It was purified as a very large complex of .apprxeq.1000 kDa in its native form. The toxins of several **Xenorhabdus** isolates were similarly purified and found to contain up to 18 subunits with sizes of 26-330 kilodaltons.

L7 ANSWER 10 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB A complex of proteins from the genus **Photorhabdus** are toxic to insects upon exposure. **Photorhabdus luminescens** have been found in mammalian clin. samples and as a bacterial symbiont of entomopathogenic nematodes of genus **Heterorhabditis**. The toxins can be applied to, or genetically engineered into, insect larvae food and plants for insect control. The complex was effective against a broad range of insect larvae when applied to soil or to leaves. Bioassays against *Manduca sexta* larvae were used to monitor purifn. of the complex and individual components were then further characterized. The complex has 10 major subunits of 23-200 kDa with some of the subunits showing microheterogeneity. Genes for the subunits were cloned by screening cosmids with N-terminal sequence-derived probes.

L7 ANSWER 11 OF 17 CAPLUS COPYRIGHT 2001 ACS

AB Purified insecticidal toxins and biol. active fragments thereof, and polynucleotide mols. encoding same, from the bacterium **Xenorhabdus nematophilus** are described. An *X. nematophilus* A24 genomic DNA clone with activity against *Galleria mellonella* larvae was sequenced. The gene was expressed in *Escherichia coli* to produce a 30 kDa protein which was stable

at 45.degree. and in the presence of 0.1% SDS. The gene was used as a hybridization probe in Southern blot anal. of DNA from **Xenorhabdus** and **Photobabdus**. Under moderate stringency wash conditions the **toxin** probe only hybridized to DNA from *X. nematophilus* and *X. beddingii* strains.